Remarks:

Reconsideration of the application is respectfully requested.

Claims 1 - 6 and 10 - 26 are presently pending in the application. Claims 24 and 26 have been amended. Claims 7 - 9 were previously canceled. As it is believed that the claims were patentable over the cited art in their original form, the claims have not been amended to overcome the references.

In item 2 of the above-identified Office Action, the specification was objected to as allegedly failing to provide antecedent basis for the processor including an electrical capacitor "wherein the state is a **change** state of the electrical capacitor. Applicant respectfully disagrees.

First, contrary to the allegation on page 2 of the Office Action, certain of the amended and new claims recite, among other limitations, that the state unit includes an electrical capacitor, such that the state is a **charge** state of the electrical capacitor (i.e., not a **change** state, as alleged in item 2 of the Office Action).

Additionally, the determination of the state of the state unit, using an electrical capacitor, is supported by the specification of the instant application, as originally filed.

For example, Applicant's originally filed claim 7 (now canceled), which depended from claim 1 and recited:

> Processor according to claim 1, **wherein the state unit includes a capacitor and the state is a charge state of the capacitor**. [emphasis added by Applicant]

Such limitation was added directly into Applicant's claim 1 and originally filed claim 7 was, accordingly, canceled.

Further, that the capacitor is an "electrical" capacitor is supported by the specification of the instant application, as well as the general understanding in the art. For example, page 8 of the instant application, second paragraph, stated:

> Fig. 2 shows a schematic representation of a first embodiment of the present invention. **This embodiment follows the approach of storing electrical energy in a capacitor. The state unit comprises a capacitor, or a unit 30 with an electrical capacitance**, and a clock generator 32 which are actively connected to each other and to the computation unit 12. In an initial state the unit 30 **with an electrical capacitance** carries no charge. **When an operation is performed by the computation unit 12 the electrical capacitance 30 is charged up under the control of a switching event of a FET. By using this capacitor** as the frequency control element of an oscillator or PLL divider which serves as the clock for the circuit element, i.e. the crypto-processor or crypto-coprocessor, the coupling with the operating speed can be achieved simply. [emphasis added by Applicant]

As such, page 8 of the instant application, as originally filed, disclosed that, in the instant invention, **electrical energy is stored in a capacitor**. It is further described that

the state unit comprises a capacitor, or a unit with an electrical capacitance. Note also that, in the description, the terms "electrical capacitance 30" and "capacitor" both designate an "electrical capacitor" (see, for example, the quoted portion referring to "**this capacitor**" in connection with both the "electrical capacitance" and the "capacitor").

Further, with regard to the amendment to Applicant's claim 13, the above quoted portion from page 8 of the instant application, second paragraph, supports the increased variable of that claim being the increased charge in an electrical capacitor (i.e., "**When an operation is performed by the computation unit 12 the electrical capacitance 30 is charged up** under the control of a switching event of a FET").

From the foregoing, it can be seen that both the original description and the originally filed claim 7, support the claim language reciting that the state unit includes an electrical capacitor and that the state is a charge (and not "change") state of the electrical capacitor. As such, Applicant respectfully requests that the current objection to the specification in item 2 of the Office Action be withdrawn.

Further, in item 2 of the Office Action, claim 26 was objected to on the basis of an informality. The Examiner's suggested

correction has been made. Additionally, claim 24 has been similarly amended.

In item 3 of the Office Action, claims 1 - 6 and 10 - 14 were rejected as allegedly being indefinite under 35 U.S.C. § 112, first paragraph, as claiming subject matter that was allegedly not described in the specification, **as described in connection with the objection to the specification in item 2 of the Office Action.** Applicant incorporates herein, the arguments made above in connection with item 2 of the Office Action. More particularly, page 8 of the instant application, as originally filed, disclosed that, in the instant invention, **electrical energy is stored in a capacitor.** It is further described that the state unit comprises a capacitor, or a unit with an electrical capacitance. Applicant's originally filed claim 7, the limitations of which were incorporated into the amended claim 1 at the time of the cancellation of claim 7, recited:

> Processor according to claim 1, **wherein the state unit includes a capacitor and the state is a charge state of the capacitor.** [emphasis added by Applicant]

As such, it is clear that the amendments to Applicant's claim 1, relating to the charge of an electrical capacitor determining the state of the state unit (claim 1) or increasing the charge of an electrical capacitor (claim 13),

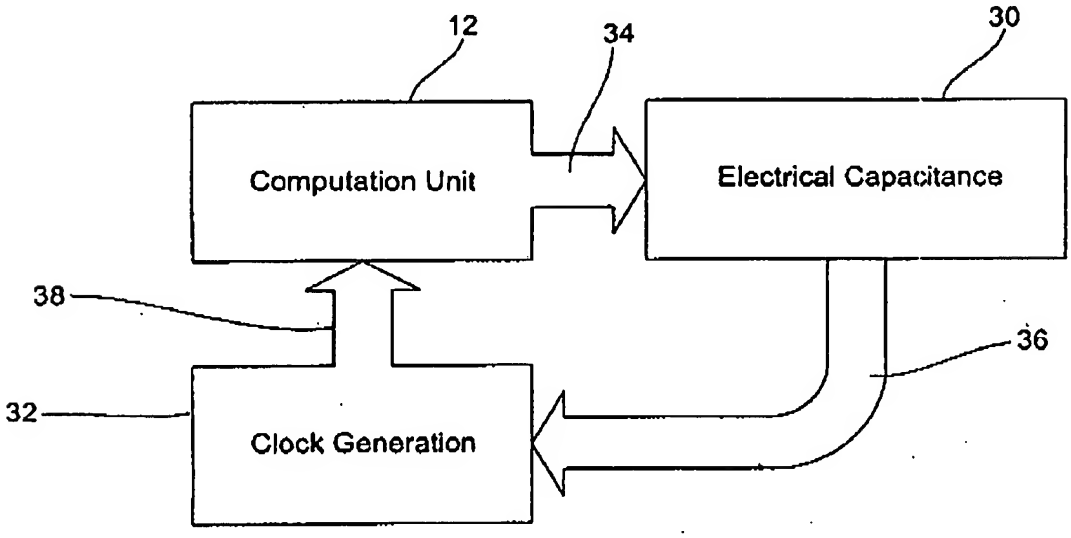
as well as the similar limitations of the new claims 15 - 26, are supported by the specification of the instant application, **as originally filed**.

The support for the new claims 15 - 26 in the original specification was pointed out in the response to the prior Office Action, which response was filed on February 27, 2007. Applicant incorporates the arguments made in that response herein, in their entirety.

Further, as stated above, the instant application, supports that the state unit is designed **to cause** an increase of a variable by which the state of the state unit can be represented **in response to the execution of an operation** by the computation unit. See for example, page 8 of the instant application, second paragraph (i.e., "When an operation is performed by the computation unit 12 the electrical capacitance 30 is charged up under the control of a switching event of a FET"). This can also be seen from the original German version of the PCT application, wherein claim 1 of the original PCT application, discloses that the state changes **in response to** an execution of an operation ("dass sich der Zustand ansprechend auf das Ausführen einer Operation durch das Rechenwerk ändert"). Thus, the expression, "in response" in the previously amended claim 1, as well as the new claims,

is supported by the specification and is in agreement with the originally filed PCT application from which the present application is based.

Applicant believes that the previously made amendments to the claims, as well as the previously presented new claims 15 - 26 are supported by the original disclosure, for example, with regard to Fig. 2 of the instant application and the description thereof. Fig. 2 of the instant application is being reproduced herebelow, for convenience.



More particularly, Fig. 2 of the instant application shows a schematic representation of a processor, according to an embodiment of the invention. The processor of Fig. 2 includes a computation unit 12 and a state unit, wherein the state unit

includes a capacitor (electrical capacitance 30) and a clock generator 32. Further aspects of the previously amended independent claims and claims 15 - 26, are described, for example, on page 8 of the instant application, second paragraph - page 10 of the instant application, first paragraph. As such, Applicant believes that the disclosure of the instant application, **as originally filed**, (i.e., including the above-cited text passages, as well as the originally filed claims 1 and 7), make clear to a person of ordinary skill in this art, upon reading the instant application, the subject-matter of the current claims.

It is accordingly believed that the specification and the claims meet the requirements of 35 U.S.C. § 112, first paragraph.

In item 5 of the Office Action, claims 1 - 6 and 10 - 26 were rejected on the grounds of nonstatutory obviousness-type double patenting, as allegedly being unpatentable over claims 1 - 11 of U. S. Patent No. 6,999,333 (the "'333 patent"). Applicant respectfully disagrees with the present double-patenting rejection.

More particularly, in response to Applicant's previous arguments over the obviousness of the present claims, in view

of the claims of the '333 patent, the Office Action maintains that " a control device which reads an electrical characteristic quantity from at least one one-time programmable cell" of the '333 patent would equate to (for purposes of double-patenting) "a computation unit for executing an operation at a speed". Moreover, the Office Action puts forward that "an assessment device, which is connected to the control device, and which compares the electrical characteristic quantity with at least a first threshold value and a second threshold value and emits a comparison result indicating an uncertain programming state" is "a state unit, which has a state, wherein the speed of the computation unit is controllable according to the state of the state unit, wherein the state unit is designed to cause an increase of a variable by which the state of the state unit can be represented each time an operation is executed by the computation unit is response to the increase of the variable due to executing of the operation". The Office Action further states that it would have been obvious to one having ordinary skill in the art to recognize that "controlling the speed of the computation unit" is equivalent to "indicating an uncertain programming state", and that a "programmable cell" is equivalent to a "processor" and that a "change of a state" is equivalent to a "difference in the electrical characteristic quantity" and that "programming a cell" is

equivalent to "the execution of an operation by the computation unit". Applicant respectfully disagrees with the analogized obviousness of the instant claims, with those of the '333 patent, in the manner set forth in the Office Action.

More particularly, the following **non-obvious** differences, among others, exist between the claims of the instant application and those of the '333 patent.

For example, the claims of the '333 patent do not render obvios, among other limitations of Applicant's present claims, **a state unit including an electrical capacitor, wherein a variable representing the charge state of the capacitor is increased in response to the execution of an operation**. Rather, as will be discussed more fully below, the recitation in the independent claims of the '333 patent of "a method for assessing **one-time programmable cells**", specifically teaches away from Applicant's presently claimed use of Applicant's particularly claimed "**electrical capacitor**" in the state unit. As will be shown herebelow, the limitation of a **one-time** programmable unit in the claims of the '333 patent, among other limitations, is **incompatible** with, and thus renders the claims patentably distinct from, the claims of the instant application.

More particularly, independent claim 1 of the present application describes a mechanism, **wherein a variable, by which the charge state of the electrical capacitor can be represented, is increased in response to the execution of an operation.** Thus, for example, the charge of the electrical capacitor may be increased in response to the execution of an operation by the computation unit. **Moreover, the speed of the computation unit is decreased in response to the increase of the variable, for example the charge of the electrical capacitor.**

Contrary to Applicant's present claim 1, the claimed invention of the '333 patent does not include, or render obvious, the **use of any capacitor**, or any other **changeable device, the charge state of which defines the speed of the computation unit.** Rather, the '333 patent discloses checking for a state of **fuses or anti-fuses**, in order to decide whether to reprogram or not a fuse or anti-fuse. Thus, in the '333 patent, **a fuse or anti-fuse, but not a capacitor**, is used to determine whether or not to reprogram a memory cell. Such would be apparent to a person of skill in this art, reading the claims of the '333 patent in view of the specification. It should be noted here that a fuse or anti-fuse differs significantly from a capacitor. According to the '333 patent, it is intended to reliably program the fuses or anti-fuses.

This is necessary due to effects, like electro-migration, which occur in so-called fuses or anti-fuses, but which do not occur with capacitors. Moreover, fuses or anti-fuses **are resistive elements** (acting like a resistor), **while a capacitor exhibits a completely different behavior, namely to store charge**. It is much easier to change the state of a capacitor simply by charging or discharging the capacitor, while the programming of a fuse or an anti-fuse is an irreversible procedure. This can be easily seen from the section "Field of the Invention" **and the independent claims of the '333 patent**, reciting that the invention of the '333 patent relates to an apparatus for assessing **one-time programmable cells**. In contrast, according to the present application, **a charge state of a capacitor is modified** (e.g. in response to the execution of an operation) and evaluated, and thus, is not a **"one-time programmable cell"**, as required by the claims of the '333 patent. Consequently, it should be seen that a state being stored **in a one-time programmable cell** (e.g. in a fuse or anti-fuse), as **required by the claims of the '333 patent**, would not render obvious, and would teach away from, the charge state of a capacitor being used, according to the claims of the present invention. As the **claims** of the '333 patent are **explicitly related** to the physical effects occurring **in one-time programmable cells**, such as fuses and anti-fuses, a person of ordinary skill in the art would surely

not use a capacitor (i.e., changeable device) to store a state.

Further, the claims of the '333 patent do not render obvious the limitation of certain of Applicant's present claims, to decrease the speed of the computation unit in response to the increase of any variable. Rather, in the '333 patent, when it is found that the one-time programmable cell is not reliably programmed, the one-time programmable cell is reprogrammed (See Col. 3 of the '333 patent, lines 33 - 48).

To summarize the above, the '333 patent, in its entirety, is completely silent about increasing a variable, by which the charge state of a state unit comprising an electrical capacitor can be represented, in response to the execution of an operation. The claims of the '333 patent limit the invention for use with **"one-time programmable cells"**. As such, contrary to the presently claimed invention, the claims of the '333 use a one-time (irreversible) programming method, such as a fuse or anti-fuse, **which is completely different from the use of the a charge state of a capacitor, as presently claimed.**

Moreover, the '333 patent is completely silent about decreasing the speed of a computation unit in response to an

increase of the variable representing the charge state of the electrical capacitor, as required by certain of Applicant's present claims. The '333 patent does not give any hint about varying the speed of any computation unit, and merely describes reprogramming the fuse or anti-fuse.

All independent claims of the '333 patent are limited to **assessing one-time programmable cells**, namely fuses and anti-fuses. **The present application claims the opposite, namely to use an electrical capacitor, which is not a one-time programmable cell, but a reprogrammable charge storage device.** From the claims of the '333 patent, and also from the description thereof, it is clear that in said document the term "cell" means a "**one-time programmable cell**" (See, for example, the preamble of the independent claims of the '333 patent). From this point of view, the subject-matter claimed within the present application is clearly unobvious from, and taught away from, the claimed subject-matter of the '333 patent.

Further, features of the present independent claims are not anticipated nor rendered obvious by the claims of the '333 patent. For example, regarding independent claim 15 of the instant application, the claims of the '333 patent are completely silent about, and thus, do not render obvious, controlling the speed of the computation unit according to a

first temperature and a second temperature and is, in fact, completely silent about any temperature impact.

Regarding independent claim 20 of the instant application, the claims of the '333 patent does not describe, and thus do not render obvious, the presence of a filament resistor. Moreover, the '333 patent does not describe to change any speed of a computation unit and is silent about modifying the speed in response to an increase of a variable, by which the temperature of the state unit can be represented.

Regarding independent claim 21, the specification and claims of the'333 patent are silent about, and thus does not render obvious, using a state unit with a thermal capacitance, wherein the state is a temperatures of the unit. Rather, the '333 patent claims assessing **a one-time programmable cell**. However, **a thermal capacitance** is surely not a one-time programmable cell, but can change its state repeatedly. The claims of the '333 patent do not render obvious changing the speed of a computation unit, as outlined above, nor do they render obvious controlling a clock rate generated by a clock generator in dependence on an output signal of a temperature sensor.

Regarding new independent claim 22, said claim defines, in addition to the features discussed above, a certain, particular relationship between the speed of the computation unit and the variable, by which the state of the state unit can be represented. One possible relationship is that the speed of the computation unit is inversely proportional to the variable, by which the state of the state unit be represented. Another alternative is that the speed of the computation unit is inversely exponential to the variable, by which the state of the state unit be represented. Neither of these options are rendered obvious by the claims of the '333 patent. Rather, said document does not even describe to change the speed of the computation unit, but merely discusses reprogramming a memory cell. The '333 patent does not disclose any relationship between, for example, a number of reprogramming attempts and a variable representing a state of a state unit.

Regarding independent claim 23 of the instant application, the claims of the '333 patent do not render obvious using a clock generator, which is adapted to change the speed of the computation unit in steps in dependence on the state of the state unit.

Regarding independent claim 24 of the instant application, the claims of the '333 patent do not render obvious allowing for

setting a factor for a relationship between a state of the state unit and the speed of the calculation unit or for setting an amount of energy supplied to the state unit **by means of a programmable parameter**. The change of the speed of the computation unit is also not described in the '333 patent. Regarding independent claim 25 of the instant application, the claims of the '333 patent do not render obvious controlling the number of bits, which are processed simultaneously by an operation in the computation unit according to the state of a state unit.

Regarding new independent claim 26, the claims of the '333 patent do not render obvious decreasing the speed of the calculation unit by introducing wait clock intervals.

In short, the claims of the '333 patent recite at least one limitation (i.e., a **one-time programmable unit)** that prevents those claims from being read onto the present claims, or rendering obvious the present claims (i.e., the present claims all reciting a reprogrammable state unit including an electrical capacitor, the charge of which is set by the operation and/or determines the state of the unit). The limitation of a one-time programmable unit in the claims of the '333 patent is incompatible with, and thus renders the claims patentably distinct from, the currently claimed

invention of the instant application. As such, the claims of the instant application are believed to be independent and unobvious over the claims of the '333 patent. Thus, Applicant respectfully requests that the current double patenting rejection be withdrawn.

Further, in item 6 of the above-identified Office Action, claims 1 - 6 and 10 - 26 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U. S. Patent No. 6,330,668 to Curiger et al ("**CURIGER**").

Applicant respectfully traverses the above rejections.

I. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, the state of the state unit being a charge state of an electrical capacitor, and the speed of a computation unit being decreased in response to the increase of the charge of an electrical capacitor, as required by Applicant's claim 1.

More particularly, claim 1 recites, among other limitations:

> wherein **the state unit includes an electrical capacitor**; and
>
> **wherein the state is a charge state of the electrical capacitor**. [emphasis added by Applicant]

As discussed above, contrary to the statement made on the bottom of page 4 of the Office Action, the instant application, **as originally filed**, fully supports

that the capacitor is an "electrical" capacitor. For example, page 8 of the instant application, second paragraph, stated:

> Fig. 2 shows a schematic representation of a first embodiment of the present invention. **This embodiment follows the approach of storing electrical energy in a capacitor. The state unit comprises a capacitor, or a unit 30 with an electrical capacitance**, and a clock generator 32 which are actively connected to each other and to the computation unit 12. In an initial state the unit 30 **with an electrical capacitance** carries no charge. **When an operation is performed by the computation unit 12 the electrical capacitance 30 is charged up under the control of a switching event of a FET. By using this capacitor** as the frequency control element of an oscillator or PLL divider which serves as the clock for the circuit element, i.e. the crypto-processor or crypto-coprocessor, the coupling with the operating speed can be achieved simply. [emphasis added by Applicant]

As such, page 8 of the instant application, as originally filed, disclosed that, in the instant invention, **electrical energy is stored in a capacitor**. It is further described that the state unit comprises a capacitor, or a unit with an electrical capacitance. Note also that, in the description, the terms "electrical capacitance 30" and "capacitor" both designate an "electrical capacitor" (see, for example, the quoted portion referring to "**this capacitor**" in connection with both the "electrical capacitance" and the "capacitor").

However, the **CURIGER** reference fails to teach or suggest, among other limitations of Applicant's claims, the state of

the state unit being a charge state of an electrical capacitor, as required by Applicant's claim 1.

More particularly, **CURIGER** merely discloses the use of a chip oscillator, which may, for example, be a ring oscillator, wherein temperature impacts the oscillation circuit. In **CURIGER**, as the temperature of the silicon increases, the on-board oscillator will slow down. See, for example, col. 5 of **CURIGER**, lines 22 to 23. The on-board ring oscillator of **CURIGER** provides a clock signal to the encryption related circuitry 206. See, for example, col. 5 of **CURIGER**, lines 37 to 39. However, **CURIGER** neither teaches, nor suggests, among other limitations of Applicant's claim 1, that the state represented by a variable **is a charge state of the electric capacitor**.

More particularly, according to Applicant's independent claim 1, the state unit is designed to cause an increase of a variable, by which the charge state of the state unit can be represented, in response to the execution of an operation by the computation unit. In other words, a variable (e.g. a variable describing a charge quantity) is increased in response to the execution of an operation by the computation unit. In contrast to the invention of current claim 1, in the

circuit of **CURIGER**, the temperature of the silicon may increase in response to the execution of an operation, but **the temperature of the silicon is not a variable, by which a charge state of an electrical capacitor can be represented**.

Additionally, Applicant's claim 1 recites, among other limitations:

> a state unit, which has a state, **wherein the speed of the computation unit is controllable according to the state of the state unit, wherein the state unit is designed to cause an increase of a variable by which the state of the state unit can be represented** in response to the execution of an operation by the computation unit, **and to decrease the speed of the computation unit in response to the increase of the variable due to executing of the operation**, [emphasis added by Applicant]

However, the **CURIGER** reference is also silent **about decreasing the speed of the computation unit in response to the increase of the variable (by which the charge state of the electrical capacitor can be represented)**, as further required by Applicant's claim 1.

In other words, according to Applicant's claim 1, the charge state of the electrical capacitor, represented by "the variable", is changed in response to the execution of an

operation by the computation unit. In the invention of claim 1, this change of the charge state of the electrical capacitor **results** in a decrease of the speed of the computation unit. Thus, in the invention of claim 1, **the charge of the electrical capacitor is an intermediate quantity, which is effected by the execution of an operation unit** (a variable by which the charge state of the electrical capacitor can be represented is increased in response to the execution of an operation) **and the charge state of the electrical capacitor in return causes a decrease of the speed of the computation unit** (...to decrease the speed of the computation unit in response to the increase of the variable [by which the charge state of the electrical capacitor can be represented]...).

To summarize, the definitions of claim 1 cannot be seen in isolation, but the **overall functionality** and the interaction of the elements defined in Applicant's claim 1 define the subject matter of the claim. Thus, even if a capacitor could be found or analogized to in the disclosure of **CURIGER**, Applicant's claim 1 would still be patentable over the teachings of the **CURIGER** reference. More particularly, according to **CURIGER**, a ring oscillator is formed on the cryptographic chip. However, in **CURIGER**, the frequency of oscillation of the ring oscillator **is not affected by any changes related to the charge state of a capacitor, but is**

affected by the temperature dependent characteristics of the transistor. According to the general knowledge, the transconductance g_m of a field effect transistor decreases with increasing temperature, due to the fact that the electron mobility or hole mobility decreases with increasing temperature. Additionally, as commonly known, as the transconductance g_m of a field effect transistor decreases, the oscillator frequency of a ring oscillator also decreases. Thus, according to the teachings of CURIGER, a change of transistor characteristics is responsible for a temperature dependent change of the oscillation frequency. In contrast to the teachings and principles of CURIGER, Applicant's claim 1 of the present invention defines an embodiment where another quantity, namely the charge state of an electrical capacitor, is actually used to control the speed of the computation unit. Applicant's approach of controlling the speed of the computation unit in response to the charge state of a capacitor is completely different from the concept of generating a clock signal for a computation unit in dependence upon temperature dependent transistor characteristics. As such, Applicant's claim 1 is believed to be patentable over CURIGER.

It should be noted that, even if the ring oscillator described in CURIGER included any capacitors (not mentioned in the

disclosure of **CURIGER**), in **CURIGER, the charge state of such a capacitor would not have any impact on the oscillator frequency**. Even if the ring oscillator of **CURIGER** included a capacitor, the charge state of such a capacitor would change from a maximal value to a minimal value during a single period of oscillation. Consequently, in **CURIGER, the instantaneous charge state of such hypothethical capacitor would not effect the speed of the computation unit.**

For the foregoing reasons, among others, Applicant's claim 1 is believed to be patentable over **CURIGER**.

II. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, the speed of a computation unit being decreased in response to the increase of the charge of an electrical capacitor, as required by Applicant's claim 13

Applicant's claim 13 recites, among other limitations:

> **increasing a variable which represents a state of a state unit** by a specified value **in response to the execution of an operation by a computation unit** of the processor; and
>
> **decreasing the speed of the computation unit in response to the increase of the variable due to the execution of the operation,**
>
> **wherein the variable is a charge of an electrical capacitor.** [emphasis added by Applicant]

As such, Applicant's independent claim 13 recites, among other things, **the increase of the charge** of an electrical capacitor representing the state of a state unit, **in response to execution of an operation.** Additionally, Applicant's independent claim 13 recites, among other limitations, that **the speed of the computation unit is decreased in response to the increase of the charge of the electrical capacitor.** Thus, in Applicant's independent claim 13, the charge of the electrical capacitor is defined as an intermediate quantity being affected by the execution of an operation (...in response to the execution of an operation...), and having an effect on the speed of the computation unit, (...in response to the increase of the variable ...).

As discussed above in Section I, that section being incorporated herein, by reference, **CURIGER** neither teaches, nor suggests, among other limitations of Applicant's claims, **the use of the charge state of the capacitor as an intermediate quantity for controlling the speed of the computation unit.** Additionally as discussed above, in **CURIGER, only the temperature of the silicon**, which is automatically and unavoidably affected by the execution of an operation, can even be analogized, arguendo, to an intermediate quantity. However, **CURIGER** the increase in the temperature of the silicon in **CURIGER neither teaches, nor**

suggests, the use of the charge of an electrical capacitor as an intermediate quantity for controlling the speed of the computation unit. As such, Applicant's claim 13 is additionally believed to be patentable over the **CURIGER** reference.

III. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, an electrical filament resistor, as required by Applicant's claim 20.

Applicant's independent claim 20 recites, among other limitations:

> wherein the processor **comprises an electrical filament resistor adapted to supply energy to the thermal capacitance in response to the execution of an operation** in the computation unit.

The use of such an electrical filament resistor is supported by the specification of the instant application, for example, page 10 of the instant application, which states, in part:

> **In response to execution of an operation in the computation unit 12, energy is supplied to the thermal capacitance 50** (arrow 54), thus raising its temperature. **This can be achieved by using an electrical filament resistor,** preferably however through the waste heat of the computation unit 12 conveyed over a heat conducting connection. [emphasis added by Applicant]

However, item 6 of the Office Action, which rejects claim 20 over **CURIGER**, fails to even mention an electrical filament resistor, or where such an electrical filament resistor could, allegedly, be found in **CURIGER**. Applicant maintains that the **CURIGER** reference neither teaches, nor suggests, among other limitations of Applicant's claims, a processor **including an electrical filament resistor adapted to supply energy to the thermal capacitance in response to the execution of an operation** in the computation unit.

Further, **CURIGER** describes that the circuit is implemented in a CMOS silicon technology. See, for example, col. 4 of **CURIGER**, lines 56 - 60). It is well known that resistors are avoided in CMOS technology. Consequently, a person of ordinary skill in this art would, naturally, not include a filament resistor in the circuit of **CURIGER**.

Moreover, according to **CURIGER**, the heating of the circuit would be undesirable. Thus, a person of ordinary skill in the art, reading **CURIGER**, would, naturally, not use an electrical filament resistor in combination with the circuit of **CURIGER**. According to **CURIGER**, the heating of the silicon is an undesirable effect. In **CURIGER** , the oscillator of **CURIGER** , as well as the rest of the circuitry, should have the same temperature, such that the temperature impact on the

oscillator is the same as the temperature impact on the rest of the circuitry. See, for example, col. 4 of **CURIGER** , lines 58 - 60). Based on this understanding, a person of ordinary skill in this art would understand it to be desirable, for the circuit of **CURIGER**, to maintain the oscillator and the rest of the circuits **at the same temperature**, which understanding would prevent a person of ordinary skill in this art from providing an electrical filament resistor, as required by Applicant's claim 20.

For the foregoing reasons, among others, Applicant's claim 20 is additionally believed to be patentable over the **CURIGER** reference.

IV. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, an inversely proportional relationship between the speed of the computation unit and the variable representing the state of the state unit, and an output signal of a temperature sensor controlling the clock rate of a clock generator, as required by Applicant's claim 21.

Applicant's independent claim 21 recites, among other limitations:

> a state unit, which has a state, wherein the speed of the computation unit is controllable according to the state of the state unit, wherein the state unit is designed to cause **an increase of a variable by which the state of the state unit can be represented in response to the execution of an operation** by the computation unit, **and to decrease the speed of the**

> **computation unit in response to the increase of the variable due to executing of the operation**; and
>
> . . .
>
> wherein the state is a temperature of the unit;
>
> **wherein the clock generator is adapted such that an output signal of the temperature sensor controls a clock rate generated by the clock generator;**
> [emphasis added by Applicant]

As fully discussed in the sections, above, **CURIGER** fails to teach or suggest, among other limitations of Applicant's claims, **an inversely proportional relationship between the speed of the computation unit and the variable, by which the state of the state unit can be represented, or an inversely exponential relationship between the speed of the computation unit and the variable, by which the state of the state unit can be represented.**

Further, **CURIGER** fails to teach or suggest, among other limitations of Applicant's claims, **a temperature sensor or a clock generator adapted such that an output signal of the temperature sensor controls a clock rate generated by the clock generator, as required by Applicant's claim 21.** Rather, in **CURIGER**, the ring oscillator **has a natural temperature dependence**, caused by the temperature dependent characteristics **of the field effect transistors** disclosed in **CURIGER**. As such, among other limitations of Applicant's

claims, **CURIGER** fails to teach or suggest Applicant's particularly claimed temperature sensor of claim 1. Nor does item 6 of the Office Action, which rejects claim 21 over **CURIGER**, even mention such a temperature sensor, as claimed in Applicant's claim 21.

For the foregoing reasons, among others, Applicant's claim 21 is additionally believed to be patentable over the **CURIGER** reference.

V. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, an inversely proportional relationship between the speed of the computation unit and the variable representing the state of the state unit or wherein the state unit is so designed that the speed of the computation unit is inversely exponential to the variable, by which the state of the state unit can be represented, as required by Applicant's claim 22.

Applicant's independent claim 22 recites, among other limitations:

> wherein the state unit is so designed that **the speed of the computation unit is inversely proportional to the variable**, by which the state of the state unit can be represented, **or**
>
> wherein the state unit is so designed that **the speed of the computation unit is inversely exponential to the variable**, by which the state of the state unit can be represented [emphasis added by Applicant]

As discussed in the sections above, **CURIGER** fails to teach or suggest, among other limitations of Applicant's claims, a state unit, which is so designed that the speed of the computation unit is inversely proportional to the variable, by which the state of the state unit can be represented, or wherein the state unit is so designed that the speed of the computation unit is inversely exponential to the variable, by which the state of the state unit can be represented.

For the foregoing reasons, among others, Applicant's claim 22 is additionally believed to be patentable over the **CURIGER** reference.

VI. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, the presence of a clock generator adapted to change the speed of the computation unit in steps in dependence on the state of the state unit, as required by Applicant's claim 23.

Applicant's independent claim 23 recites, among other limitations:

> wherein **the clock generator is adapted to change the speed of the computation unit in steps in dependence on the state of the state unit,** to set the speed of the computation unit to a first high speed or to a second lower speed. [emphasis added by Applicant]

As discussed in the sections above, **CURIGER** fails to teach or suggest, among other limitations of Applicant's claims, a

state unit, which is adapted to change the speed of the computation unit **in steps**, in dependence on the state of the state unit, to set the speed of the computation unit to a first high speed or to a second lower speed.

More particularly, item 6 of the Office Action does not even allege that that **CURIGER** discloses a clock generator, **wherein the clock generator is adapted to change the speed of the computation unit in steps, in dependence on the state of the state unit**, as required by Applicant's claim 23. In fact, **CURIGER** discloses a ring oscillator, which is affected **in a continuous way** by the temperature. In **CURIGER**, this continuous impact is caused by the natural characteristic of the field effect transistor, described herein above. In contrast to the teachings of **CURIGER**, Applicant's independent claim 23 recites, among other limitations, **a step-wise change of the speed**, which is contrary to the teachings of **CURIGER**.

For the foregoing reasons, among others, Applicant's claim 23 is additionally believed to be patentable over the **CURIGER** reference.

VII. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, setting a factor for a relationship between a state of the state unit and the speed of the calculation unit or for setting an

amount of energy supplied to the state unit by means of a programmable parameter, as required by Applicant's claim 24.

Applicant's independent claim 24 recites, among other limitations:

> wherein the processor is adapted to allow for **setting a factor for a relationship between a state of the state unit and a speed of the computation unit or for setting an amount of energy supplied to the state unit by means of a programmable parameter** [emphasis added by Applicant]

Item 6 of the Office Action fails to even allege that **CURIGER** teaches or suggests, among other limitations of Applicant's claims, a circuit, wherein the processor is adapted to allow for setting a factor for a relationship between a state of the state unit and the speed of the calculation unit, or for setting an amount of energy supplied to the state unit by means of a programmable parameter, as required by Applicant's claim 24. In fact, **CURIGER** specifically teaches that the oscillator and the rest of the circuit should be heated in the same way. Thus, **no means** for setting a factor for a relationship between a state of the state unit and the speed of the calculation unit, would make any sense with respect to the disclosure of **CURIGER**. This is due to the fact that according to **CURIGER, the speed of the oscillator should change in the same way as the speed of the rest of the circuit,** in order to avoid the oscillator operating faster

than the rest of the circuit of **CURIGER**. As such, **CURIGER**, fails to teach or suggest, among other limitations of Applicant's claims, a processor adapted to allow for setting a factor for a relationship between a state of the state unit and the speed of the calculation unit, or for setting an amount of energy supplied to the state unit by means of a programmable parameter, as required by Applicant's claim 24.

For the foregoing reasons, among others, Applicant's claim 24 is additionally believed to be patentable over the **CURIGER** reference.

VIII. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, controlling a number of bits processed simultaneously, by an operation in the computation unit according to the state of the state unit, as required by Applicant's claim 25.

Applicant's independent claim 25 recites, among other limitations:

> wherein **a number of bits which are processed simultaneously** by an operation in the computation unit **is controlled according to the state of the state unit**. [emphasis added by Applicant]

Item 6 of the Office Action fails to even allege that **CURIGER** teaches or suggests, among other limitations of Applicant's claims, controlling a number of bits processed simultaneously, by an operation in the computation unit according to the state

of the state unit, as required by Applicant's claim 25. In fact, **CURIGER** fails to teach or suggest such a feature. Instead, **CURIGER** tries to synchronize the speed of the oscillator and the speed of the computation unit, **but does not teach influencing the speed of the computation unit by setting the numbers of bits which are processed simultaneously.**

For the foregoing reasons, among others, Applicant's claim 25 is additionally believed to be patentable over the **CURIGER** reference.

IX. The CURIGER reference fails to teach or suggest, among other limitations of Applicant's claims, the introduction of wait clock intervals to decrease the speed of the computation unit, as required by Applicant's claim 26.

Applicant's independent claim 26 recites, among other limitations:

> a state unit, which has a state, wherein the speed of the computation unit is controllable according to the state of the state unit, wherein the state unit is designed to cause an increase of a variable by which the state of the state unit can be represented in response to the execution of an operation by the computation unit, and to decrease the speed of the computation unit in response to the increase of the variable due to executing of the operation,
>
> **wherein wait clock intervals are introduced to decrease the speed of the computation unit.** [emphasis added by Applicant]

Item 6 of the Office Action fails to even allege that **CURIGER** teaches or suggests, among other limitations of Applicant's claims, **the introduction of wait clock intervals to decrease the speed of the computation unit**, as required by Applicant's claim 26. In fact, **CURIGER** neither teaches, nor suggests such a limitation, as **CURIGER** intends that the speed of the oscillator be synchronized with the speed of the computation unit.

For the foregoing reasons, among others, Applicant's claim 26 is additionally believed to be patentable over the **CURIGER** reference.

X. Conclusion.

It is accordingly believed that none of the references, whether taken alone or in any combination, teach or suggest the features of claims 1, 13 and 20 - 26. Claims 1, 13 and 20 - 26 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claims 1 or 13.

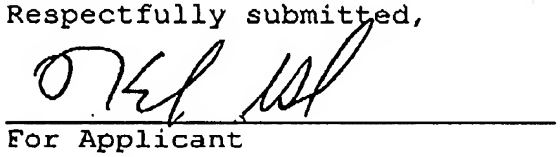
In view of the foregoing, reconsideration and allowance of claims 1 - 6 and 10 - 26 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out. In the alternative, the entry of the amendment is requested, as it is believed to place the application in better condition for appeal, without requiring extension of the field of search.

If an extension of time for this paper is required, petition for extension is herewith made.

Please charge any fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Stemer LLP, No. 12-1099.

Respectfully submitted,



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